Information Acquisition Costs and Misreporting: Evidence from the Implementation of EDGAR

Yibin Liu *

University of California San Diego

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Abstract

I study the causal effect of investors' costs in acquiring corporate filings on misreporting. Lower information acquisition costs potentially deter misreporting through enhanced monitoring. However, the other channel is that managers may be more inclined to misreport anticipating that more investors use accounting information in valuing stocks. I study this empirical question with plausibly exogenous variations in investors' information acquisition costs using the U.S. firms' staggered transition from paper filings of periodic reports to electronic filings on the EDGAR system from 1993 to 1996. I find that lower information acquisition costs lead to an increase in accrual-based and real earnings management: discretionary accruals go up by 1 to 1.5% of lagged total assets and abnormal production costs go up by 1% of lagged total assets. My results highlight an unintended consequence of EDGAR and also the importance of having a wholistic understanding of managers' incentives.

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1 Introduction

Starting from the 1990s, the U.S. Securities and Exchange Commission (SEC) has been continuously lowering investors' costs in acquiring corporate information through technological innovations such as the internet. In 1993, the SEC launched the Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system[1] to provide investors with free and instant access to all corporate filings online. Furthermore, the SEC allowed public companies to directly announce key financial information to investors on social media sites in 2013. Jung et al. (2017) find that almost half of all S&P 1500 firms manage their own Twitter accounts to enhance investors' awareness of their public releases by 2015. A natural research question to ask is: how do lower costs in acquiring corporate information feed back into managers' behaviors?

There are two channels through which information acquisition costs impact managers' incentives to misreport. Lower information acquisition costs potentially lead to enhanced monitoring of financial information which deters misreporting.[2] On the other hand, investors typically use different sets of information including accounting information in valuing stocks.[3] If investors make more use of accounting information due to its reduced cost, managers would have a higher marginal benefit of misreporting an additional dollar (Samuels et al., 2018). In the extreme case, managers will have no incentive to misreport if investors completely disregard accounting information.

Consequently, the impact of information acquisition costs on misreporting is ulti-

[1] EDGAR is the primary system for submissions by companies and others who are required by law to file information with the SEC.

[2] This monitoring view is supported by evidence that managers are less likely to engage in opportunistic behaviors when there is higher scrutiny from institutional investors (Kempf et al., 2016), financial analysts (Yu, 2008), and corporate outsiders in general (Du and Zhang (2012); Kim et al. (2018a); Jing and Ng (2019)).

[3] For example, investors may use macroeconomic conditions, industry prospects, historical price movements, and also information collected from firms' customers, suppliers, and employees.

mately an empirical question. However, as one could imagine, it is difficult to isolate the impact of investors' acquisition costs on misreporting from other confounding factors of misreporting.[4] I tackle this challenging identification problem with a novel archival setting: the staggered implementation of the EDGAR system by the SEC from 1993 to 1996.[5]

Prior to EDGAR, firms transmitted to the SEC paper copies of all corporate filings which were stored in public reference rooms. For investors interested in conducting fundamental research, they would contact companies that specialize in retrieving documents and pay a base rate of $32 for a copy of 10-K, $16 for a 10-Q and $25 for an annual report (*The Washington Post*, 1993). The advent of EDGAR made corporate filings freely accessible online. And the commercial access to the internet can bought for as little as $2 per hour (*Wall Street Journal*, 1992). Furthermore, in addition to personal computers at home, many college students could access internet through campus internet connection and employees through their companies' connection (*New York Times*, 1993). I also provide summary statistics on web visits in Section 2.2 to show that both institutional and retail investors had been actively using EDGAR for acquiring corporate information

[4]There are data on how much corporate information investors might have acquired. For example, Jing and Ng (2019) use number of downloads of corporate filings from the SEC's EDGAR system as a proxy for information acquisition. Other potential proxies can be number of visits to firms by institutional investors, Google Trends' daily search volume index (Song, 2018), and web traffic to public companies' Wikipedia pages (Zhu, 2019b). However, the observed information acquisition is the product of both information acquisition costs and a number of unobservable firm-level factors. An identification problem will arise if the unobservable firm-level factors also affect managers' misreporting decisions. For any change in investors' information acquisition, how can we tell whether it leads to changes in misreporting, or whether some unobserved factors that drive both information acquisition and misreporting?

[5]In 1992, the SEC divided firms into 10 groups and set the phase-in schedule with the first group scheduled to be phased-in in April 1993 and the last group in May 1996.

According to annual reports by the SEC from 1983-1986, the EDGAR system was designed to "accelerate dramatically the filing, processing, dissemination and analysis of corporate information" and also to "revolutionize the manner in which investment decisions are made" by "reducing from days and weeks to minutes and hours the public dissemination of time sensitive corporate information". Please see Section 2.2 for more institutional details.

since its inception.[6]

Secondly and also most crucially for identification, the staggered implementation of EDGAR provides plausibly exogenous time variations in when different groups of firms were phased-in. Put differently, this empirical setting offers an ideal set of counterfactuals for how misreporting would have changed across time in the absence of changes in information acquisition costs. Consequently, I am able to disentangle the effect of information acquisition costs from other unobservable and time-varying determinants of misreporting. Moreover, the staggered setting greatly lessens endogeneity concern because it is difficult to come up with an unobservable factor that affects different groups of companies' misreporting at exactly the same time as specified in the SEC's phase-in schedule.

For the whole sample, I show that firms increase both accrual-based and real earnings management after they were subject to mandatory electronic filings on EDGAR. More precisely, discretionary accruals go up by 1 to 1.5% of lagged total assets and abnormal production costs go up by around 1% of lagged total assets.

Furthermore, I split my sample into firms with low, medium, and high ex-ante investor attention[7] to test the theory by Samuels et al. (2018) that ex-ante level of public scrutiny has a hump-shaped relation with misreporting. I find that misreporting increases with public scrutiny for firms with low and medium ex-ante investor attention.

[6] Admittedly, going from paper to electronic filings may not have a significant effect on large institutional investors since they already have both incentives and resources to acquire costly 10-K/Qs before EDGAR. As a result, my documented effects probably mainly come from the increase in information acquisition by smaller institutional and retail investors.

One caveat is that I do not directly observe the intensity of monitoring by the SEC at firm-level in the 1990s. The SEC staff members would carefully review all corporate filings regardless of whether they were in paper or on EDGAR. Hence, there is no obvious reason to believe that the SEC responded differentially to paper versus electronic filings during the transition period. Secondly, given that it was easier to retrieve, search, and cross-reference information from electronic than paper filings, firms filing electronically were more likely to be closely monitored, which would go against me finding that misreporting increased after firms were phased-into EDGAR.

[7] See Section 4 (Research Design) for details on how I define ex-ante level of investor attention.

Moreover, the positive slope is much steeper for firms with low ex-ante attention than those with medium attention. As for firms with high ex-ante investor attention, I find that the positive slope either flattens out or becomes negative depending on my proxies for misreporting. In summary, my results support the theoretical predictions by Samuels et al. (2018) that misreporting has a hump-shaped relation with ex-ante level of public scrutiny.

Taken together, my results point to an important unintended consequence of requiring firms to file on EDGAR.[8] The main objective of the EDGAR system is to improve market transparency and efficiency by providing investors with free and instant access to time-sensitive corporate information. While the EDGAR system has been very successful in helping retail investors making more informative trades (Gao and Huang, 2019), my results show that managers are also incentivized to misreport more in anticipation of lower investor information acquisition costs. Moreover, the increase in misreporting is concentrated in firms with low ex-ante investor attention. As for policy implications, it is crucial to understand managers' intricate incentives when introducing seemingly welfare-enhancing technological innovations such as the EDGAR system.

I perform a battery of robustness checks to lend further credibility to my results. To start with, I control for fixed idiosyncratic firm misreporting choices with firm fixed effects, time-related factors with year fixed effects, and firm-level correlated shocks across time by clustering standard errors by firm. Secondly, I analyze the dynamic effect of mandatory filings on the EDGAR system in the years before and after each firm's actual phase-in date. The impact of the EDGAR system only materializes when it was in place. The estimated coefficients of the years before actual phase-in year are not significantly different from zero, suggesting that trends in misreporting across mandatory

[8] To be clear, my analysis is by no means a comprehensive welfare analysis of the EDGAR system which may be done by future research with careful structural modelling.

EDGAR filers and paper filers were not significantly different before EDGAR. Thirdly, I include Industry × Year fixed effects in my specifications to absorb industry-specific time trends. Moreover, I include phase-in group specific time trends to ensure that my estimated effects are not driven by differential time trends across phase-in groups. Across all specifications, I find a consistently positive impact of filing electronically on misreporting.

The rest of the paper is organized as follows: Section 2 reviews the literature and also presents institutional details on the EDGAR system. Section 3 defines the variables used and discusses sample selection. Section 4 describes my empirical research design including identification strategy and robustness checks. Section 5 discusses my results and Section 6 concludes.

2 Literature Review and Institutional Detail

2.1 Literature Review

Firstly, my paper is related to studies on the impact of EDGAR. Research in the 2000s generally find that investors respond to 10-K/Q filings on the filing date and very shortly thereafter.[9] In contrast, research in the early 1990s report a limited statistical evidence of investor response to pre-EDGAR paper filings.[10] More costly investor access to SEC filings in the pre-EDGAR era has definitely played an important role in driving the differential response to pre and post EDGAR filings along with other factors.[11] Gao and Huang (2019) is the first paper documenting a causal increase in information production by analysts and retail investors after firms were phased-into EDGAR. To the best of my knowledge, my paper is the first to study the causal effect of mandatory electronic filings on EDGAR on corporate insiders' misreporting decisions.

My research is also related to a growing strand of literature studying the impact of investors' information processing costs. Blankespoor et al. (2019) lay out a sequential framework of investors' information usage consisting of 3 major steps: awareness, acquisition, and integration. Blankespoor et al. (2019) provide evidence that awareness

[9] For instance, Qi et al. (2000) find that 10-K reports filed through EDGAR contain incremental information that is useful for firm valuation. Asthana and Balsam (2001) find that stock market reacts significantly to filings on EDGAR in terms of both price and trading volume. Griffin (2003) reports that the absolute value of excess return is reliably greater on the day of and on the one or two days immediately following the filing date from 1996 to 2001. Asthana et al. (2004) document an increase in the volume of small trades for firms filed 10-K on EDGAR for the first time whereas there is no significant change for large investors. Li and Ramesh (2009) show that significant market reaction surrounding 10-Q/QSB/KSB reports is limited to filings that release earnings information for the first time, while significant reaction is also obtained for 10-K reports when they are filed around calendar quarter-ends from 1996 to 2006.

[10] For example, Easton and Zmijewski (1993) document significant results when no preliminary earnings announcements precede the 10-K filing but insignificant results conditional on a preliminary announcement. Response at the time of a 10-Q filing is found to be mostly insignificant.

[11] For instance, there are difficulties in pinpointing the exact date the market learns about the contents of a 10-K/Q in the pre-EDGAR era primarily due to large variations between filing receipt and posting (Griffin, 2003).

and acquisition costs are not the primary barriers to individual investors' use of accounting information.[12] In addition, this literature has documented an extensive amount of capital market consequences of information processing cost.[13] Consequently, it is fair to hypothesize that capital market effects feed back into managers' real decisions which remain relatively under-explored. The notable exceptions are: XBRL adoption (Blankespoor, 2019) increases footnote disclosures; both XBRL (Kim et al., 2018a) and number of downloads of corporate filings on EDGAR (Jing and Ng, 2019) lower earnings management. I contribute to this literature by showing that managers actually engage in more earnings management after a significant reduction of acquisition costs with a novel archival setting.[14]

My paper is also closely related to a growing literature studying the impact of corporate outsiders' scrutiny on managers. Broadly speaking, two views have emerged

[12]They conjecture that investors disregard accounting information probably due to unobservable integration costs and behavioral biases. However, they also acknowledge that the type of individual investors in their sample is likely on the lower end of the sophistication spectrum. Moreover, Kang et al. (2019) show that information acquisition cost is actually the key driver that local institutional investors have better information about local firms than do non-local investors. Hence, it is still debatable the exact impact of information acquisition costs on investors' using accounting information.

[13]For example, previous research exploit the staggered implementation of the eXtensible Business Reporting Language (XBRL) to show that it reduces information asymmetry between corporate insiders and outside stakeholders (Kim et al., 2012), decreases cost of capital (Li et al., 2012), improves analyst forecast quality (Liu et al., 2014), decreases credit default swap spreads (Griffin et al., 2014), increases firm specific information in the stock prices (Dong et al., 2016), and enlarges breadth of stock ownership (Kim et al., 2018b).

[14]My results do not necessarily contradict what Kim et al. (2018a) find. The XBRL mandate mostly enhances investors' capacity in **processing** thousands of pieces of financial data from corporate filings with computer-readable tags. In contrast, EDGAR significantly lowers investors' costs in **acquiring** corporate filings, which is the step before processing any financial information.

Admittedly, it is also plausible that both XBRL and EDGAR increase public scrutiny of financial information. The results from Kim et al. (2018a) and my paper can be rationalized with the theory by Samuels et al. (2018), which shows that misreporting has an inverse U-shaped relation with public scrutiny. There has been a substantial increase of scrutiny on public firms from EDGAR implementation in the 1990s to XBRL adoption in 2009 due to increases in analyst coverage and institutional holdings as well as enhanced monitoring by the SEC since the passage of Sarbanes-Oxley Act of 2002. Assuming that average level of public scrutiny in the 1990s is to the left of the inflection point whereas that around XBRL adoption (2009) is close to or to the right of the inflection point, an increase in public scrutiny by EDGAR (XBRL) would increase (decrease) misreporting.

from this literature: monitoring view and pressure view. I briefly discuss relevant papers supporting each view in Table 1 in the Appendix. My paper adds to this debate by providing the first causal evidence that managers engage in both accrual and real earnings management in response to an increase in investors' acquisition of accounting information.

2.2 Institutional Details on the EDGAR system

2.2.1 Dissemination of Corporate Filings Before EDGAR

In the 1980s, the SEC's public reference rooms were the ultimate repository for stock analysts, lawyers, investment bankers, government bureaucrats and investors of all sorts to gain information on the inner workings of American companies (*New York Times*, 1982). Firms registered with the SEC had to transmit paper copies of all corporate filings to the SEC by mail, by courier, or by personal delivery (Gao and Huang, 2019). Paper copies were first reviewed by the SEC staff and then stored in three reference rooms for public viewing in Washington DC, New York, and Chicago.[15]

Before EDGAR, an investor would go through the following process to obtain a copy of 10-K/Q. He first calls one of a dozen companies which specialize in retrieving documents and maintain an army of professionals in the public reference rooms.[16] The

[15]The one in DC was situated in a government building in downtown Washington and consisted of a small study area, file cabinets, computer terminals, and copy machines (*New York Times*, 1982).

[16]The public reference rooms were difficult to navigate even for professionals whose job was to retrieving files quickly for clients, let alone investors who may want to personally visit the public reference rooms. The 15 reference room staff members did not have time to help since they were preoccupied with sorting and filing about 160,000 documents, responding to 15,000 written requests a year, and also answering as many as 400 phone inquiries per day (*New York Times*, 1982). A researcher with Disclosure Inc said "It's just incredible the number of problems you can run into trying to find something you need." and Director of research for Charles E. Simon & Company, another professional research firm, said simply, "The place can be a zoo." (*New York Times*, 1982). And because the stacks and microfiche files were accessible to anyone, files were often misplaced or even stolen.

professionals would then chase down a microfiche,[17] read it with a computer, and then print out copies for their clients.[18] In terms of pricing, *New York Times* (1982) reports that a page costs 35-90 cents. A 100-page 10-K would then cost an investor $35-90 in the 1980s. Fast forward to 1993 right before EDGAR, *The Washington Post* (1993) reported that all requests for filing information were handled by the SEC contractor Disclosure Inc. of Bethesda which operated the SEC public reference rooms. Disclosure Inc. charges a base rate of $32 for copies of 10-K filings, $16 for 10-Q filings and $25 for annual reports.[19]

Consequently, it is fair to say that pricey corporate filings in the paper era might have created an unlevel playing field for institutional and retail investors. Institutional investors have better resources and also higher incentives to acquire costly information from corporate filings. However, most of retail investors were probably deterred from conducting timely fundamental research on public firms.[20] Taken together, the non-trivial costs in accessing corporate filings result in fewer eyeballs on corporate filings than the case where everyone has instant access to filings on EDGAR.[21]

[17] The microfiche storage system began in 1967 and most of the information reported by companies was stored in index-card-sized microfiche by 1980s (*New York Times*, 1982).

[18] One caveat is that I am not sure whether clients need to pay a fixed subscription fee to those companies. Moreover, I do not have information on the composition of these firms' clients, whether they are mostly institutional or retail investors.

[19] Disclosure also resells the information via electronic database and CD-ROM, as do competitors.

[20] Take it one step further, retail investors might optimally shift from fundamental research to technical analysis in which they study historical price trends to uncover what institutional investors know.

[21] Admittedly, there are other ways to obtain 10-K/Q than SEC's public reference rooms. Public firms mail a paper copy of annual report to their shareholders. Non-shareholders including institutional and retail investors and financial analysts may write to firms requesting a copy of 10-K/Q. However, I have not found information on how promptly firms respond to requests from non-shareholders. My conjecture is that firms were unlikely to respond to such requests promptly as inferred from the fact that there were a dozen firms specializing in retrieving documents for their clients.

2.2.2 The Staggered Implementation of EDGAR

The development of the EDGAR system by the SEC consists mainly of two stages: a pilot system[22] commencing in 1984 and a fully operational system starting in 1993. After the success of the pilot system, the SEC proceeded with developing a fully operational EDGAR system. On February 23, 1993, the SEC released a phase-in schedule for firms to transmit corporate filings electronically to the EDGAR system. The phase-in of all domestic filers to the EDGAR system was completed in May 1996.

2.2.3 Do Investors Actively Use EDGAR?

I have taken the following three steps to address the concern about whether investors actively use EDGAR. To begin with, there is anecdotal evidence that investors indeed acquire financial documents from EDGAR for fundamental research as mentioned by the following quote from *Fortune Magazine* 1995:

> Edgar contains enough financial documents to cause fibrillations of delight in the heart of any number cruncher. From the search screen you simply enter a company name, and Edgar returns with an interactive list of 10-Ks, 10-Qs, 8-Ks, X-17A-5s, and the whole gamut of other disclosure forms. [...] Jules Garfunkel, of Morristown, New Jersey, says he uses Edgar regularly to track down the financial fundamentals of companies whose securities he might consider buying.

The anecdotal evidence is further substantiated by the SEC's annual report. Investors would be able to access "10K/Q and all other corporate filings instantly on home computer screens". They would be able to "display current comparative price-earning,

[22] See Appendix 7.5 for more information on the pilot system.

yield, and other data on securities; instantly refine such lists by industry, size, markets and other criteria; display the latest SEC filings, annual and quarterly reports of those companies in which they are interested or that appear to be the most undervalued".

Secondly, one might be worried about the availability and also cost of internet access to investors in the 1990s. First off, around 11.4% of the U.S. households owned a personal computer with a modem as reported in the 1994 Current Population Survey.[23] The commercial access to the Internet can be bought for as little as $2 an hour (*Wall Street Journal*, 1992). Moreover, households with internet access probably have disproportionately larger wealth and stock holdings than population average. Furthermore, Gao and Huang (2019) present causal evidence that retail investors indeed produce valuable information using EDGAR to make more informative trades.

Thirdly, I provide further supplementary evidence on the amount of web visits to the EDGAR website. As reported in the 1996 annual report by the SEC:

> During the first full year of operation, the [EDGAR] system was heavily accessed,[...] **Average daily connections** exceeded **267,000** and daily data volume downloaded averaged over 10,500,000 bytes.[...] The SEC's home page has become one of the most popular government sites on the World Wide Web.

As a comparison, Yahoo! was "one of the 10 most-visited websites" and had an average of 500,000 visits each day in 1995 (*New York Times*, 1995).

The SEC's summary statistics on web visits are substantiated by New York University's

[23] 1994 is the earliest year when households' internet access was surveyed (Gao and Huang, 2019). *New York Times* (1993) further highlighted that "many college students may now obtain Internet access as part of their tuition costs and many businesses buy a high-speed Internet connection [...] permits employees to share unlimited access to the network." The actual percent of households with internet access is probably way higher than 11.4% as reported by the survey.

data on the number of requests to the EDGAR system[24] (Gao and Huang, 2019). The data provide a breakdown of web access to the system by domain names during the week ending July 30, 1995. Gao and Huang (2019) further manually identify retail investors using domain names and find that individual investors likely represent over 24.45% of the total number of requests and 31.39% of the total amount of data requested.

2.2.4 How the SEC Assigned the Phase-In Groups?

The short answer is that neither the SEC and nor researchers now knows exactly how firms were assigned to different phase-in groups.[25]

When the SEC released the Request for Proposal (RFP) for a fully operational EDGAR system in 1987, the SEC mentioned in its annual report that the RFP also requests that contractors propose phase-in schedules by criteria such as company size, industry or dissemination market interest.[26] Furthermore, the SEC mentioned that the phase-in schedule would be determined by the Commission after consultation with the contractor. However, the exact criteria used by the SEC remain elusive.

As mentioned above, the SEC might decide the group assignment based on company size. Larger firms tend to have better technological facilities to transition from paper to electronic filings on EDGAR. As a result, my conjecture is that larger firms would be phased-in first. To shed light on my conjecture, I start by plotting the 25^{th} and 75^{th} percentile log total assets in the end of year 1992 for firms across 10 groups. As seen from Figure 2, log total assets declines monotonously with phase-in group number except for

[24] https://town.hall.org/govt/tuttle/stats_edgar_domain_073095.html

[25] Gao and Huang (2019) filed a Freedom of Information Act request to the SEC for information on how companies are assigned to different groups. The SEC responded that their staff conducted a thorough search of the SEC's various systems of records, but did not locate or identify any information responsive to the request.

[26] The phase-in period for mandatory filing is necessary to allow a reasonable time for system development and a 6-month test period for the initial group of mandatory filers.

group 1, 9, and 10.[27] Furthermore, firms' log total assets alone explains 27% of variations in group number in a multinomial logit regression. To sum up, I find suggestive evidence that the SEC assigned groups based on a size-related criterion which I explicitly control for in all of my later empirical analyses.

2.2.5 Can Firms Switch to a Different Phase-in Group?

As stated in the SEC Release No.33-6977, firms could request to the SEC for switching to a different phase-in group. The SEC would only permit firms to change phase-in dates if they indeed face technical difficulties in filing electronically. According to the summary statistics by the SEC, around 3% of all firms started electronic filing on a different date than what was specified in the original release.

Since firms may delay or accelerate their electronic filings for strategic reasons, I use pre-specified rather than actual phase-in date. However, using pre-specified phase-in date introduces measurement error into my variable of interest. Hence, the estimated coefficient is attenuated towards zero. Given that mandatory electronic filings are found to significantly increase misreporting, the true impact is probably even larger.

[27] Group 1 does not have the largest total assets since it consists entirely of firms that were volunteer filers in the pilot system. The SEC also recruited a sizeable amount of smaller firms to test the pilot system. I am still investigating why group 9 and 10 have relatively large total assets.

3 Variable Definitions and Sample Selection

3.1 Variable Definitions

Discretionary Accrual

Dechow (1994) argues that discretionary accruals often provide managers the opportunities to manipulate earnings. I use both proxies for discretionary accruals estimated from the Jones model (Jones, 1991) and modified Jones model as advocated by Dechow et al. (1995) for robustness. See Appendix 7.4 for more details on the Jones and the modified Jones model.

I follow Kothari et al. (2005) in cross-sectionally estimating the modified Jones Model using sales changes net of the change in account receivables:

$$\frac{Total\ \ Accruals_t}{A_{t-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{t-1}} + \alpha_2 \frac{\Delta S_t - \Delta AR_t}{A_{t-1}} + \alpha_3 \frac{PPE_t}{A_{t-1}} + \epsilon_t \tag{1}$$

where $Total\ \ Accruals_t$ is calculated as the change in non-cash current assets minus the change in current liabilities excluding the current portion of long-term debt, minus depreciation and amortization. With respect to COMPUSTAT, $Total\ \ Accruals_t$ $= \Delta Data\#4 - \Delta Data\#1 - \Delta Data\#5 + \Delta Data\#34 - Data\#14$. ΔS_t is the change in sales from year $t-1$ to t and ΔAR_t is the change in account receivables from year $t-1$ to t. The use of assets as the deflator mitigates heteroskedasticity in residuals.[28]

I estimate the above cross-sectional regression for each industry-year group with at least 15 observations. The estimated residuals, capturing the abnormal part of accruals,

[28] While prior research typically does not include a constant in the above model, Kothari et al. (2005) include a constant for several reasons. First, the constant provides an additional control for heteroskedasticity in residual. Second, it mitigates problems stemming from an omitted size variable. Third, discretionary accrual measures based on models without a constant term are less symmetric, making power of the test comparisons less clear cut. My results are robust to whether I include the constant term or not.

proxy for firms' accrual-based earnings management.

Proxies for Real Earnings Management

Real earnings management refers to management actions that deviate from normal operational practices and are undertaken with the primary objective of meeting certain earnings thresholds (Roychowdhury (2006), Zang (2011)).

Following Roychowdhury (2006), I examine three major components of real earnings management: the abnormal levels of cash flow from operations (CFO),[29] production costs,[30] and discretionary expenses.[31] I estimate the normal levels of CFO, production costs, and discretionary expenses using the models developed by Dechow et al. (1998) as implemented in Roychowdhury (2006). More specifically, I run the following 3 cross sectional regressions for each industry and year with at least 15 observations to estimate normal level of CFO, production costs, and discretionary expenses respectively. For CFO:

$$\frac{CFO_t}{A_{t-1}} = \alpha_0 + \alpha_1(\frac{1}{A_{t-1}}) + \alpha_2(\frac{S_t}{A_{t-1}}) + \alpha_3(\frac{\Delta S_t}{A_{t-1}}) + \epsilon_t \tag{2}$$

where CFO_t is cash flow from operations in period t. A_{t-1} is the total assets in year $t-1$. S_t is sales in year t. ΔS_t is the change in sales from year $t-1$ to t.

Secondly, I estimate the normal level of production costs using the following regression:

$$\frac{PROD_t}{A_{t-1}} = \alpha_0 + \alpha_1(\frac{1}{A_{t-1}}) + \alpha_2(\frac{S_t}{A_{t-1}}) + \alpha_3(\frac{\Delta S_t}{A_{t-1}}) + \alpha_4(\frac{\Delta S_{t-1}}{A_{t-1}}) + \epsilon_t \tag{3}$$

[29] Firms can accelerate the timing of sales through price discounts or more lenient credit terms which temporarily increase earnings in the current periods. However, both price discounts and more lenient credit terms will lower cash flows in the current period after controlling for change in sales.

[30] Firms can over produce to inflate earnings. Overproduction spreads the fixed overhead costs over larger amount of unit and thus lowering fixed costs per unit. Under the assumption that reduction in fixed costs per unit is larger than potential increases in marginal cost per unit, overproduction lowers cost of goods sold and hence increases earnings.

[31] Firms can boost current period earnings by cutting back on or slowing the growth of discretionary expenditures including R&D, advertising, and selling, general, and administrative (SG&A) expenditures

where $PROD_t$ is the sum of the cost of goods sold in year t and the change in inventory from $t-1$ to t. The residual is then used as a proxy for abnormal production cost. The higher the residual is, the larger is the amount of inventory overproduction, and the greater the increase in reported earnings through reducing the cost of goods sold.

Lastly, I estimate the normal level of discretionary expenditures using the following regression:

$$\frac{DISX_t}{A_{t-1}} = \alpha_0 + \alpha_1(\frac{1}{A_{t-1}}) + \alpha_2(\frac{S_{t-1}}{A_{t-1}}) + \epsilon_t \tag{4}$$

where $DISX_t$ is the discretionary expenditures (i.e., the sum of R&D, adverting, and SG&A expenditures) in year t. The abnormal level of discretionary expenditures is measured as the estimated residual from the regression.

3.2 Sample Selection

I obtain the phase-in schedule for all firms in the U.S. from Appendix B of SEC Release No. 33-6977 (released on February 23, 1993) which provides name of the firm, the Central Index Key (CIK), phase-in group number (CF 01 to 10), and phase-in date for each group. Next, I match firms on the SEC's schedule with COMPUSTAT using CIK and company name to obtain data on firms' fundamentals. There are 5,913 firms on the SEC phase-in schedule that have financial information in COMPUSTAT as of 12/31/1992.[32] Furthermore, I obtain data on analysts' earnings forecasts from Institutional Brokers' Estimate System (I/B/E/S) which is used to calculate the number of annual earnings forecasts made by distinct analysts. The data on institutional holdings are from Thomson Reuters. My main sample includes all firms that are both on the SEC's phase-in schedule

[32]It is worth noting that I exclude firms that go public after the release of the phase-in schedule to eliminate the possibility that firms endogenously choose the timing of their IPO in response to the staggered implementation of EDGAR.

and have fundamental information from COMPUSTAT ranging from 1991 to 1998.

Since I construct my earnings management proxies at annual frequency, I re-group the SEC's 10 phase-in groups into 4 different treatment groups based on their respective phase-in year. More precisely, my first treatment group consists of firms that were phased-in in 1993 which correspond to all firms listed as Group CF 01-04 as in SEC's phase-in schedule. Moreover, I drop all firms from Group CF 01 since all of them had already been filing electronically on the EDGAR system as volunteer filers on the pilot system starting from 1984. For firms in the first treatment group, annual report of 1993 was the first annual report they filed on the EDGAR System. Hence, $Post - EDGAR_{i,t}$ equals 1 for firms in the first treatment group in year 1993 and thereafter. Similarly, $Post - EDGAR_{i,t}$ equals 1 for firms in the second treatment group in year 1994 and thereafter which are Group CF 05 and 06 in the SEC's schedule. Lastly, the third treatment group (CF 07-09) filed their first annual report on EDGAR in year 1995 and the fourth (CF 10) in year 1996.

I eliminate firms in regulated industries (SIC codes between 4400 and 5000) and banks and financial institutions (SIC between 6000 to 6500). All continuous variables are winsorized at 1% and 99% percentile. As seen from Table 3, my main final sample consists of 20,996 firm-year observations for 3,144 distinct firms ranging from year 1991 to 1998 and . I show the summary statistics of the finalized sample in Table 4.

4 Research Design

4.1 Identification

4.1.1 Difference in Differences Estimation

The main identification strategy exploits the staggered implementation of the EDGAR system over different phase-in groups. The first goal is to evaluate the impact of mandatory electronic corporate filings on public firms' misreporting. To do that, I estimate the following equation:

$$EM_{i,t} = c_i + c_t + \beta * Post - EDGAR_{i,t} + Controls_{i,t} + \epsilon_{i,t} \tag{5}$$

where i indexes firm and t indexes year. The dependent variable is a proxy for either discretionary accrual or real earnings management depending on the specification. $Post - EDGAR_{i,t}$ equals to one when firm i is subject to mandatory filing on EDGAR in year t and stays one afterwards. I control for fixed idiosyncratic firm misreporting choices with firm fixed effects, time-related effects with year fixed effects, and potential transitory shocks that are correlated across time for a specific firm by clustering standard errors by firm. The coefficient of interest, β, is identified from the time variations in when different groups of firms started filing electronically on EDGAR. β captures the difference between the change in phased-in firms' level of misreporting and the change in non-phased-in firms' misreporting.

Furthermore, I control for lagged firm characteristics that influence managers' misreporting. More specifically, I control for firm size by including SIZE which is the natural log of market capitalization (e.g. Dechow (1994); Dechow and Dichev (2002)). To control for growth opportunities across firms, I include the market-to-book ratio and

also CSALES which is the change in sales divided by lagged sales. Moreover, I include LEV (ratio of long-term liabilities to total assets) since DeFond and Jiambalvo (1994) show that firms with massive long-term liabilities are more likely to manage earnings to avoid violating debt covenants. Following Kothari et al. (2005), I control for potential confounding correlation between cash flows and accruals by including CASH which is calculated as the ratio of cash flow from operations to lagged total assets. I also include an indicator Big 4/5 Auditor if a firm's financials are audited by a big 4/5 auditor to control for auditor quality (Becker et al., 1998). It is worth noting that I do not control for earnings surprise, commonly used as a control variable in the literature (Kim et al., 2018a), since analyst coverage was very sparse in the 1990s which would significantly reduce my sample size.

4.1.2 Endogeneity Concerns

My identification strategy treats the timing of each treatment group's phase-into EDGAR as exogenous to firm's misreporting decisions. This identifying assumption is reasonable since it is essentially impossible for the SEC to perfectly predict how firms would manage their earnings in the subsequent 4 years when the SEC set the phase-in schedule in 1992. Furthermore, it is hard to think about an omitted variable that correlates with both misreporting and with the exact phase-in schedule by the SEC. Nevertheless, I take the following steps to lend more support to my identification strategy.

A. Dynamics.

Many explanations related to coincident changes and reverse causation predict that the effects of the EDGAR would show up in the years prior to the actual phase-in dates. I therefore analyze the dynamic effect of mandatory filings on EDGAR in the years before

and after the actual phase-in date using the following specification:

$$EM_{i,t} = c_i + c_t + \sum_{l=-2}^{l=2} \beta_l * EDGAR_{i,l} + Controls_{i,t} + \epsilon_{i,t} \quad (6)$$

The key variables of interest are a set of 5 indicator variables $EDGAR_{i,l}$ which denote the relative year around each firm's phase-in year from 2 years before to 2 years after. For example, the indicator $EDGAR_{i,-1} = 1$ for firms in year 1992 if this set of firms was phased-in in year 1993. The rest of the indicator variables are defined analogously with respect to 2 years before being phased-in: $EDGAR_{i,-2}$, the phase-in year: $EDGAR_{i,0}$, the first year after the phase-in: $EDGAR_{i,1}$, and two years after: $EDGAR_{i,2}$.

B. Testing Samuels et al. (2018)

The theory by Samuels et al. (2018) predicts that public scrutiny has an inverse-U shaped relation with misreporting. The implication is that small increases in scrutiny will increase misreporting for firms with low ex-ante public scrutiny but decrease misreporting for firms with high ex-ante public scrutiny.

I use the staggered implementation of the EDGAR system as plausibly exogenous increases of public scrutiny on firms. To empirically test Samuels et al. (2018), I split the sample into firms that had low, medium, and high investor attention before the EDGAR system. There are 3 potential proxies for investor attention: analyst following, institutional holdings, and total assets [33]. I use different combinations of the 3 proxies as measures for investor attention. More precisely, I use the following criteria for firms with low ex-ante attention as of Dec 31^{st}, 1992: 1) no analyst following and total assets in the 1^{st} quartile 2) no analyst following and no institutional owner 3) no institutional owner and total assets in the 1^{st} quartile 4) no analyst following, no institutional owner,

[33] Smaller firms tend to receive less attention from media and retail investors(Gao and Huang, 2019).

and total assets in the 1^{st} quartile. Moreover, high ex-ante investor attention firms as of Dec 31^{st}, 1992 are those with 1) at least 1 analyst following and total assets in the 4^{th} quartile 2) at least 1 analyst following and at least 1 institutional owner 3) at least 1 institutional owner and total assets in the 4^{th} quartile 4) at least 1 analyst following, at least 1 institutional owner and total assets in the 4^{th} quartile. Once I pin down firms with low and high ex-ante investor attention in each case, the rest of the sample is then categorized as firms with medium ex-ante investor attention.

It is worth noting that I use an ex-ante measure of investor attention (measured in the end of 1992) which is before the actual phase-in period for all firms (1993 to 1996). An alternative way is to measure investor attention in the year right before each firm's phase-in year which should be more precise[34] since there might be changes to investor attention between end of 1992 to the year before phased-in. However, the latter measure is contaminated by endogenous changes in investor attention anticipating firms' phase-into the EDGAR system. For example, there might be endogenous increases in analyst following and institutional holdings in 1994 for firms that are scheduled to be phase-in in 1995. Hence, I use the former ex-ante measure of investor attention.

One caveat of my test is that I do not observe the exact magnitude of the increase in public scrutiny brought by EDGAR. If indeed EDGAR leads to a small increase in public scrutiny, the EDGAR setting is ideal for testing Samuels et al. (2018). However, it is also possible that EDGAR substantially increases public scrutiny for firms with low/medium ex-ante investor attention. Suppose the increase in public scrutiny is so large that it passes the inflection point, I may not find a significant increase of misreporting for firms with low/medium ex-ante investor attention even if predictions by Samuels et al. (2018) are correct. In other words, my test is a joint test of the magnitude of the increase in

[34] except for the first treatment group that was phased-in in 1993.

public scrutiny and the theory by Samuels et al. (2018).

C. Industry × Year Fixed Effects and Group-Specific Time Trends

I include Industry × Year fixed effects in my specifications so that all industry-specific trends are absorbed. The estimated results are barely affected by adding industry × year fixed effects.

One threat to my identification strategy is that the estimated coefficient of variable of interest might be capturing different time trends across different phase-in groups. To counter this threat, I include group-specific time trends as additional controls. Therefore, the impact of EDGAR on misreporting is identified as each group's deviation from pre-existing group-specific time trends. If my estimated effects are not driven by differential time trends across phase-in groups, the inclusion of such time trends will not change either statistical significance or economic magnitude of the estimated effects.

D.Alternative Proxies for Discretionary Accrual

I also use alternative proxies for discretionary accruals for robustness. More specifically, I estimate discretionary accrual using the Jones Model either with an intercept or without an intercept.

E. Additional Cross-Sectional Tests - In Progress

I am working on additional cross-sectional tests such as:

- heterogeneity in the sensitivity of CEO compensation to stock prices (Jing and Ng, 2019):

5 Results

5.1 Discretionary Accrual

As shown from Panel A of Table 5, discretionary accruals go up by 1 to 1.5 % of last year's total assets for firms subject to mandatory filing on EDGAR. The estimated coefficient is stable and statistically significant across 4 different specifications: (1) the uni-variate specification, (2) with both firm and year fixed effects, (3) with both fixed effects and time-varying firm-level controls, (5) with firm fixed effect, industry × year fixed effect, and phase-in group specific time trends.[35]

For specifications 4 and 5, I also include suspect firm-years as firms with ROA from 0 to 0.5% which are more likely to have managed earnings than rest of firms (Roychowdhury, 2006). Consistent with the literature, I show evidence that suspect firms indeed engage in more discretionary accrual by around 1.5% of lagged total assets than other firms. However, I don't find evidence that suspect firms engage in more discretionary accrual after they start filing on EDGAR. One potential explanation is that cost of managing earnings is convex in the amount of bias. Suspect firms have difficulty in managing additional discretionary accrual given that they have already been managing up discretionary accrual.[36]

As for the dynamic effect of filing electronically on EDGAR on discretionary accrual, sub-figure a of Figure 3 presents the estimated coefficients and the 95% confidence intervals for all dynamic effects spanning 2 years before and 2 years after firms' phase-in

[35] Furthermore, my results are robust to alternative measures of discretionary accrual as seen from Panel B of Table 5. More specifically, my results hold for using discretionary accrual estimated from the Jones Model either with an intercept or without an intercept.

[36] Additionally, from the perspective of Samuels et al. (2018), suspect firms might have high level of public scrutiny before they are on EDGAR. An additional boost in public scrutiny brought by the EDGAR may push the misreporting level to the right of the inflection point so that there is no significant incremental increase in misreporting by suspect firms.

year. The coefficients of the years before the actual phase-in year are not significantly different from zero. Therefore, trends in misreporting across mandatory EDGAR filers and paper filers are not significantly different before they were phased-into EDGAR. These results also alleviate the concern that the estimated effects may be driven by unobserved firm characteristics that are correlated with both the timing of the EDGAR implementation and misreporting. In summary, the time-series pattern confirms that the impact of EDGAR only materializes when the EDGAR system was in place.

Lastly, I empirically test Samuels et al. (2018) using discretionary accrual as a proxy for misreporting. The 4 specifications reported in Panel A of Table 7 only differ by how low and high ex-ante investor attention firms are defined. I use 4 different combinations of analyst following, institutional holdings, and total assets as proxies for ex-ante level of investor attention.[37]

Since I omit the interaction term between Medium-Attention firms and Post-EDGAR in the regressions, the estimated coefficient of the Post-EDGAR indicator measures the relative change in misreporting for firms with medium ex-ante investor attention. Moreover, the estimated coefficient of low-attention (high-attention)×Post-EDGAR captures difference of change in misreporting between firms with low (high) and medium ex-ante investor attention. To gauge how much misreporting changes for firms with high ex-ante investor attention after they are phased-into EDGAR relative to control firms, I add up the coefficients of Post-EDGAR and of High-attention×Post-EDGAR.

There are three main takeaways from Panel A of Table 7. Firstly, firms with medium ex-ante investor attention increase discretionary accrual by about 1% of lagged assets relative to control firms. Moreover, this result is mostly robust to different definitions of ex-ante investor attention. Secondly, the increase in discretionary accrual is mostly

[37] Please see details on my definitions in the Research Design section.

significantly larger for firms with low ex-ante investor attention than firms with medium ex-ante investor attention. Lastly, the increase in discretionary accrual for firms with high ex-ante investor attention is not significantly different from or even lower than firms with medium ex-ante investor attention.

Taken together, my results suggest that slope of the relation between public scrutiny and misreporting is positive for firms with low and medium ex-ante investor attention. Moreover, the positive slope is much steeper for firms with low ex-ante investor attention.[38] From medium attention firms and onwards, the slope slightly flattens out. In summary, my results are broadly consistent with predictions by Samuels et al. (2018) that public scrutiny has a hump-shaped relation with misreporting.[39]

5.2 Real Earnings Management

Turning to real earnings management results in Panel A of Table 6, firms inflate their earnings only through over-production to lower their cost of goods sold after they start filing electronically on EDGAR (specification 2). I do not find significant evidence that firms have abnormally low cash flow from operations as a result of price discounts (specification 1), or slow the growth of their discretionary expenditure on R&D, SG&A, and marketing (specification 3). One possible explanation is that over production seems to be the least harmful to firms in the long run among the three commonly used real earnings management practices.[40]

In terms of economic magnitude, I find that electronic filing with EDGAR results in firms over-producing by around 1% of lagged assets. The impact on production cost is

[38] under the assumption that increase in public scrutiny was the same for firms with low and medium ex-ante investor attention after they were phased-into EDGAR.

[39] Nevertheless, my results are more supportive of a flat level of misreporting instead of a strict decrease after public scrutiny passes the inflection point.

[40] under the assumption that additional inventories can be reasonably preserved in warehouses.

much stronger for suspect firms. In addition, the estimated effect is robust to industry × year fixed effect and also group specific time trends as in Panel B of Table 6.

To support the parallel trend assumption, I estimate the dynamic effect of the EDGAR system on production cost as in sub-figure b of Figure 3. Neither of the coefficients in the two years before actual phase-in year is significant. In short, the estimated dynamic effects lend further support to my identification strategy by showing that the effect of EDGAR on misreporting only emerges after the EDGAR system was in place.

Next, I split the sample into firms with low, medium, and high ex-ante investor attention to test Samuels et al. (2018) using abnormal production cost as a proxy for misreporting. As seen from Panel B of Table 7, I find that after being subject to filing on EDGAR: 1) firms with medium ex-ante investor attention do not significantly increase their abnormal production cost relative to control firms 2) firms with low ex-ante investor attention increase their abnormal production cost as a share of lagged total assets by around 2%. An F-test further shows that the increase for low-attention firms is significant at 95% confidence level 3) firms with high ex-ante investor attention generally significantly decrease their abnormal production costs relative to firms with medium ex-ante investor attention. Adding up coefficients of Post-EDGAR and of Post-EDGAR × High-Attention, high attention firms are found to decrease their production costs relative to control firms.[41]

In short, my results on production costs again support predictions by Samuels et al. (2018) that increases in public scrutiny would increase misreporting when ex-ante public scrutiny is relatively low. In addition, I provide suggestive evidence that misreporting would actually decrease after an increase in public scrutiny if firms already have high ex-ante scrutiny.

[41] The caveat here is that sum of the coefficients is not significant at 95% confidence level.

6 Conclusion

This paper studies the causal impact of investors' costs in acquiring corporate filings on managers' decision to misreport. Intuitively, lower information acquisition costs enhance monitoring and thus increases likelihood of detecting misreporting. Consequently, managers are expected to refrain from misreporting. However, it is also crucial to take into account that lower information acquisition costs plausibly increase investors' weight on accounting information in valuing stocks which will boost up managers' marginal benefit of inflating an extra dollar.

To empirically answer this question, I exploit the U.S. public firms' staggered transition from paper filings of corporate information with the SEC to electronic filings on EDGAR starting from 1993 to 1996. The introduction of the EDGAR system revolutionized public dissemination of time-sensitive corporate information by making corporate filings freely accessible to investors on computer screens in minutes, instead of days and weeks in the paper filing era. The staggered implementation of the EDGAR system provides an ideal set of counterfactuals for how misreporting would have changed across years in the absence of changes in information acquisition costs. This setting allows me to disentangle the effect of information acquisition costs on misreporting from other unobservable confounding determinants of misreporting.

I show that plausibly exogenous decreases in information acquisition costs lead to substantially higher accrual-based and real earnings management. My results shed light on an important unintended consequence of the EDGAR system, which has been widely applauded as a revolutionary technological innovation in providing timely corporate information for investors' decision making.

7 Appendix

7.1 Literature Review

Table 1: **Summary of Literature**

	Monitoring	Pressure
Institutional Investor	Kempf et al. (2016); Zhu (2019a)	Bushee (1998); Matsumoto (2002)
Financial Analysts	Yu (2008)	Irani and Oesch (2016); He and Tian (2013); Huang et al. (2017)
Retail Investor		**(My Paper)**
General Public	Du and Zhang (2012);Kim et al. (2018a); Jing and Ng (2019)	**My Paper**

- Note: the purpose of this brief and certainly not exhaustive literature review is to shed light on tension between the two views: monitoring and pressure. Neither do I review the literature on other important users of corporate financial information such as media (eg: Miller (2006)), the SEC, credit rating agencies, banks, etc.
- Institutional Investor:
  - Zhu (2019a) shows that alternative data (eg: consumer transactions and satellite images) purchased used by assets managers reduce managers' opportunistic trading and improves firms' investment efficiency.
  - Kempf et al. (2016) report that firms with distracted institutional shareholders are more likely to announce diversifying and value-destroying acquisitions.
  - Bushee (1998) and Matsumoto (2002) find that **transitory** higher institutional investors lead to more earnings management activities such as RD investment cuts.

  - Note that Bushee (1998) also finds that, in general, institutional ownership reduces pressures on managers for myopic investment behavior.

- Financial Analysts:
  - Yu (2008) find that firms followed by more analysts manage their earnings less.
  - Irani and Oesch (2016) use brokerage house mergers as exogenous changes to analyst coverage and find that managers use real earnings management to enhance short-term performance in response to analyst pressure.
  - He and Tian (2013) provide additional evidence supporting the pressure view by finding that firms covered by a larger number of analysts generate fewer patents and patents with lower impact.
  - Huang et al. (2017) find that greater analyst coverage raises the pressure on managers to meet analyst earnings forecasts.

- General Public (a mixture of institutional, retail investor, and also analysts)
  - Du and Zhang (2012) show that firms report much lower income for in the missing months which are induced by fiscal year changes and presumably receive much less attention from the market.
  - Jing and Ng (2019) examine the how investors' acquisition of information on companies filings from the SEC's EDGAR system impacts earnings management. They find that number of downloads are negatively related to earnings management.
  - Kim et al. (2018a) use staggered XBRL implementations to show that XBRL reduces absolute discretionary accruals.

– Blankespoor (2019) provides evidence that the decrease in information processing costs induced by XBRL adoption encourages firms to increase footnote disclosures.

7.2 Variable Definitions

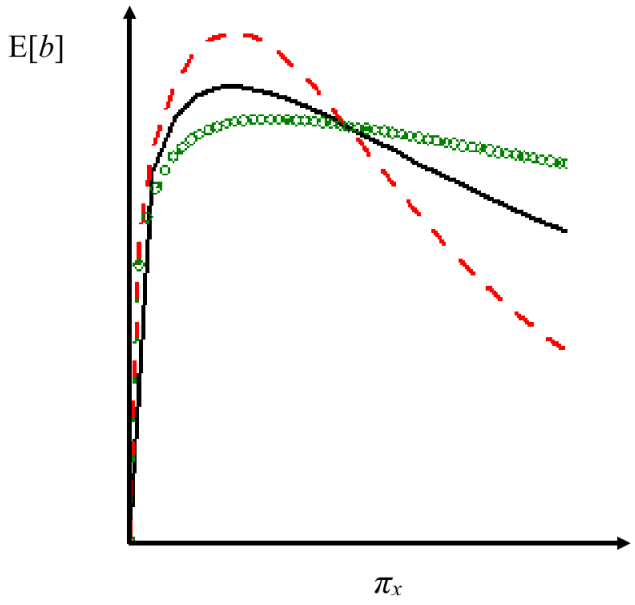
Table 2: **Variable Definitions**

Variables	Definitions	Sources
Dependent Variables		
Discretionary Accrual	Residual of Industry-Year Regression using Jones and Modified Jones Models	Compustat
Abn. Prod. Costs	Following Roychowdhury (2006)	Compustat
Abn. CFO	Following Roychowdhury (2006)	Compustat
Abn. Disc. Exp.	Following Roychowdhury (2006)	Compustat
Variable of Interest		
Post-EDGAR	Indicator Variable: equal to 1 after a firm is on EDGAR	SEC release
Control Variables		
Market to Book	Market capitalization/Book value of equity	Compustat
SIZE	Natural log of market capitalization	Compustat
Big 4 Auditor	Indicator if a firm's financials audited by a Big 4/5 auditor	Compustat
LOSS	Indicator if a firm reports a negative earnings	Compustat
# of Shares	Natural log of the number of firm shares outstanding	Compustat
LEV	Ratio of long-term liabilities to assets	Compustat
Other Variables		

7.3 Details on Samuels et al. (2018)

The most relevant theory to my paper is a recent paper by Samuels et al. (2018) which shows analytically that ex ante level of public scrutiny has a unimodal impact on manager's misreporting in the equilibrium as in Figure 1. More precisely, a small rise in public scrutiny increases manager's misreporting when the level the scrutiny is low since public scrutiny's valuation effect dominates monitoring effect. However, misreporting declines with an increase in public scrutiny when the level of scrutiny is sufficiently high ex-ante due to the dominating impact of the monitoring channel. To sum up, the countervailing forces of the monitoring and valuation channels are driving the unimodal relationship between public scrutiny and misreporting shown in Figure 1.

Figure 1: Samuels et al. (2018): Unimodal Relationship Between Public Scrutiny and Misreporting For Different Cost Functions



7.4 Details on the Jones and modified Jones Model

The starting point for measuring discretionary accruals is total accruals. To decompose total accruals into discretionary versus non-discretionary accruals, all models assume a certain process generating the non-discretionary accruals. More specifically, Jones (1991) proposes a model to control for the effect of changes in a firm's economic conditions on nondiscretionary accruals. Namely:

$$NDA_t = \alpha_1(1/A_{t-1}) + \alpha_2(\Delta REV_t) + \alpha_3(PPE_t)$$

where NDA_t is non-discretionary accrual, A_{t-1} lagged total assets, ΔREV_t change in revenue, and PPE_t property, plant and equipment.

One of the key assumptions in the Jones Model is that change in revenues is non-discretionary. However, as pointed out by Dechow et al. (1995), the Jones model will remove part of the managed earnings from the discretionary accrual proxy if earnings are managed through discretionary revenues [42].

To overcome the limitation in Jones model that it might extract discretionary revenue from discretionary accruals, Dechow et al. (1995) adjusted the Jones model by substracting change in account receivables from the change in revenue. Namely:

$$NDA_t = \alpha_1(1/A_{t-1}) + \alpha_2(\Delta REV_t - \Delta REC_t) + \alpha_3(PPE_t)$$

where ΔREC_t is the change in account receivables.

The modified Jones Model assumes that all changes in credit sales (account receivables) result from earnings management which is based on the reasoning that it is easier

[42] For example, managers can use their discretion to accrue revenues at year-end when the cash has not yet been received and it is highly questionable whether the revenues have actually been earned

to manage earnings by exercising discretion over the recognition of revenue on credit sales than it is to manage earnings by exercising discretion over the recognition of revenue on cash sales.

7.5 Additional Institutional Details on EDGAR

Pilot EDGAR system

The development of the EDGAR system by the SEC consists mainly of two stages: a pilot system[43] commencing in 1984 and a fully operational system starting in 1993. In 1983, a staff task force was formed within the SEC to commence in 1984 a pilot electronic filing, processing and information dissemination system. The pilot high-speed electronic filing system was commenced on schedule on Sept 24, 1984. A group of approximately 150 companies volunteered to participate initially including participants such as AT&T, Exxon, General Motors, IBM and other major corporations, as well as small companies.

To lower registrants' cost associated with participating in the pilot system, corporate filings are accepted in three different electronic media: direct transmissions over telephone lines, diskettes, and magnetic tapes. Electronic dissemination to the public under the pilot is through computer terminals in the Commission's three Public Reference Rooms. In addition, computer-generated microfiche is produced overnight. Microfiche of electronic filings is thereby produced 14 to 20 days faster than for paper filings.

Fully Operational EDGAR

After the success of the pilot system, the SEC proceeded with developing a fully operational EDGAR system. On Jan 3, 1989, the 8-year operational contract to design and operate the EDGAR system was awarded to the BDM Corporation for approximately $52 million with Mead Data Central Inc, Sorg Incorporated, and Bechtel Information Services as subcontractors.

At first, EDGAR was not free to investors. Under the contract with the SEC, Mead

[43] See Appendix 7.5 for more information on the pilot system.

Data Central offers EDGAR through its Lexis and Nexis Services[44] and sells access to the database to the public for fees regulated by the SEC (*Wall Street Journal*, 1992).[45] The SEC expects brokerage firms, news organizations and other information services to subscribe to the Mead database and resell the information to their customers (*Wall Street Journal*, 1992), which has drawn criticisms from public interest groups.[46] In response to public criticism, the House Subcommittee on Telecommunications and Finance asked the SEC to look at making filings available on the Internet (*The Washington Post*, 1993).[47] In the end, the Internet Multicasting Service, a non-profit organization, along with New York University made EDGAR filings available to internet users for free starting from Jan. 17^{th}, 1994 with a $660,000 two-year grant from National Science Foundation (*New York Times*, 1993).[48]

[44] at $15 for each S.E.C. document, plus a connection charge of $39 an hour and a printing charge of about $1 a page (*New York Times*, 1993).

[45] A minimum subscription costs $36,000 a year which is out of reach for most investors. Subscribers who want access to back-filings, for example, a company's year-end reports for the past three years, would have to pay more than $400,000 a year (*Wall Street Journal*, 1992).

[46] For example, the Taxpayer assets Project, a public interest group founded by Ralph Nader, claims that EDGAR is too pricey for small investors (*Wall Street Journal*, 1992).

[47] In a June 10 letter, the SEC said Internet access would cost $775,000 the first year and $396,000 annually thereafter. The SEC said there's no need for the government to spend the additional money (*The Washington Post*, 1993). Here is some very interesting politics between the Clinton Administration and the SEC (*New York Times*, 1993). Clinton Administration was determined to offer broader public access to government information which was a shift away from the Federal information policies under Presidents Ronald Reagan and George Bush who favored letting private companies sell printed and eletronic versions of Government data. There was a huge industry that had grown up to sell financial records, court cases and other public documents over services like Mead Data Central's Nexis and Lexis networks. As concrete evidence, in June 1993, the Office of Management and Budget announced that it was reversing previous Administration policy that had defined Government information as a commodity, often available for sale to private industry. The new policy encouraged Federal agencies to make as much information as possible available to the public with fees as low as possible.and SEC's concerns over the expense of EDGAR. However, from the SEC's perspective, it may face pressure from companies that specialize in retrieving financial documents. A free access to EDGAR puts those companies out of business. Furthermore, the SEC was short of budget to make EDGAR free to public since EDGAR was criticized in a report by the congressional General Accounting Office last September for running $20 million over budget and several years behind schedule (*The Washington Post*, 1993).

[48] The data would be delayed by a day compared to the instant access that is provided by some on-line publishers for financial professionals. Under terms of the science foundation grant, the New York University researchers will buy raw data and reformat them so that they can be obatined over the Internet through the Internet Multicasting Service.

As a result, for companies in the first four phase-in groups, there was an interim period when the filings were electronically filed but were available at a sizeable cost, which limits the accessibility of these filings. The interim period does not affect my research design. Firstly, I omit the first phase-in group since they were already on the pilot system since the 1980s. Secondly, the second group started in July 1993 which is after the publishing of their 1992 10-K. Hence, the first 10-K that is easy to access is still 1993 10-K which is the same as how I define the Post-EDGAR indicator.[49]

The free service of providing corporate filings online by New York University and Internet Multicasting Service was scheduled to end in Oct 1995 when grants from private companies and the National Science Foundation run out. A *New York Times* (1995) article reported that the chairman of the Securities and Exchange Arthur Levitt Jr. said he would "do everything I possibly can" to continue free public access to corporate disclosure documents over the Internet. In Oct. 1995, two companies Disclosure Corporation of Bethesa and Global Securities Information, Inc. announced that they would provide free access to Securities and Exchange Commission EDGAR filings on the Internet (*Information Today*, 1995).

[49] One caveat is that some companies from the first four phase-in groups may have filed their 1992 10-K on EDGAR due to different fiscal year ends.

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Figure 2: 25th and 75th Percentile Log Total assets Across Phase-in Groups in year 1991

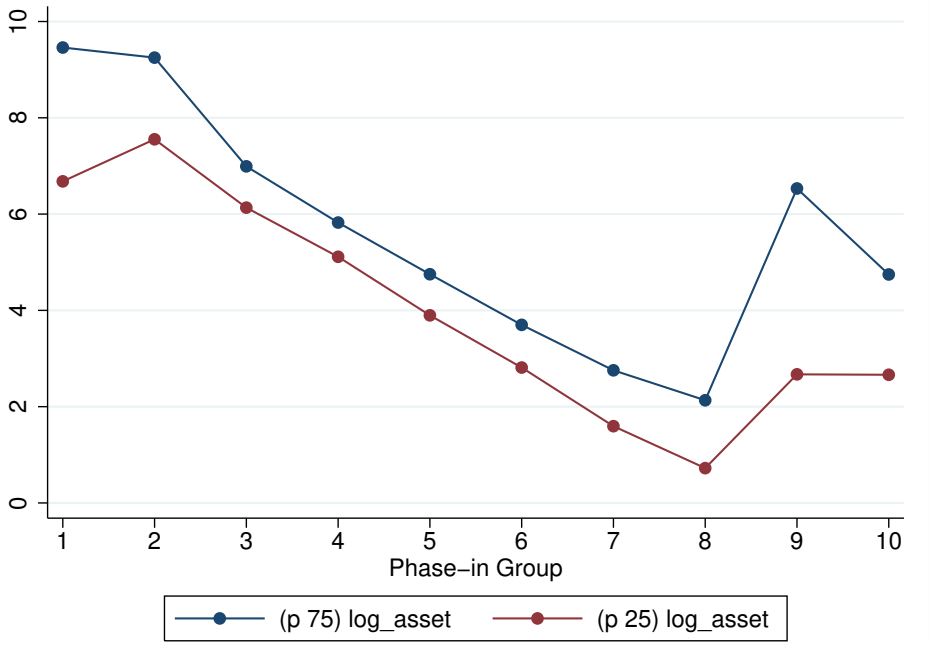
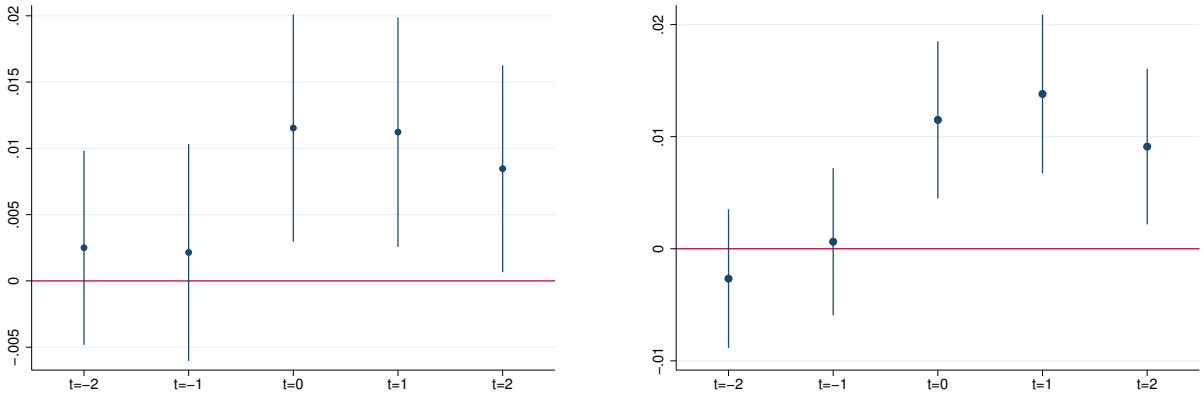


Figure 3: Dynamic Impact of the EDGAR System on Misreporting



(a) Discretionary Accrual (b) Production Cost

Figure 3 illustrates the dynamic effect of the EDGAR system on firms' level of misreporting in the years around the phase-in year. Figure 3a and Figure 3b estimate the following specificiation with different proxies for earnings management.

$$EM_{i,t} = c_i + c_t + \sum_{l=-2}^{l=2} \beta_l * EDGAR_{i,l} + Controls_{i,t} + \epsilon_{i,t} \tag{7}$$

The proxy for earnings management in Figure 3a is discretionary accrual estimated using the modified Jones model whereas the proxy in 3b is the abnormal production cost. Both figures plot the 95% confidence interval around each point estimate of the set of indicator variables: $EDGAR_{i,l}$ which captures the dynamic effect of the EDGAR system from 2 years before each firm's phase-in year to 2 years after. For example, the indicator $EDGAR_{i,-1} = 1$ for firms in year 1992 if this set of firms was phased-in in year 1993. The rest of the indicator variables are defined analogously with respect to 2 years before being phased-in:$EDGAR_{i,-2}$, the phase-in year:$EDGAR_{i,0}$, the first year after the phase-in:$EDGAR_{i,1}$, and two years after:$EDGAR_{i,2}$. Standard errors are clustered at firm level.

Table 3: Sample Selection and Industry Composition

Panel A: Sample Selection Procedure

	Details	Firm-Year	Firms
Step 1	Firms on SEC's phase-in schedule and have financial information on COMPUSTAT as of 12/31/1992		5,913
	a) : sample period 1991-1998	39,386	
Step 2	Exclude firms with missing values of proxies for discretionary accrual and real earnings management	(10,528)	(1,607)
Step 3	Exclude observations without controls for main regressions	(4,416)	(683)
Step 4	Exclude firms from financial (SIC 6000-6900) and utility industries (SIC 4900-4949)	(2,999)	(415)
Step 5	Exclude firms from CF-01 group which were already on EDGAR pilot program	(447)	(64)
	Total	20,996	3,144

Panel B: 2-Digit SIC Industry Composition

2-digit SIC	Industry	No.	%
01-09	Agricultural and Forestry	56	0.27
10-19	Mining, Oil and Gas, and Others	1,790	8.52
20-27	Food, Printing and Publishing	2,401	11.44
28-29	Chemicals, Petroleum and Coal, Rubber and Plastics	1,975	9.41
30-39	Metal, Machinery and Equipment	7,981	38.01
50-59	Wholesale and Retail	2,505	11.93
70-79	Business Services, Auto Repair and Recreation	2,638	12.56
80-89	Health, Engineering and Management Service	1,091	5.20
99	Others	564	2.69
Total		20,996	100

Table 4: Summary Statistics

	N	mean	sd	p10	p25	p50	p75	p90
Discretionary Accrual	20,996	-0.00	0.16	-0.15	-0.06	0.00	0.06	0.15
Abnormal CFO	20,996	0.01	0.19	-0.16	-0.05	0.03	0.10	0.19
Abnormal Production Cost	20,996	-0.02	0.24	-0.30	-0.15	-0.02	0.10	0.25
Abnormal Discretionary Expend.	20,996	0.02	0.35	-0.31	-0.14	-0.01	0.14	0.39
Post-EDGAR	20,996	0.56	0.50	0.00	0.00	1.00	1.00	1.00
Number of Analyst	20,996	1.06	4.35	0.00	0.00	0.00	0.00	1.00
Leverage Ratio	20,982	0.62	0.61	0.19	0.34	0.53	0.71	0.96
Return on assets	20,986	-0.06	0.37	-0.28	-0.05	0.03	0.08	0.13
Log(Market Cap)	19,173	4.22	2.25	1.38	2.66	4.13	5.74	7.25
Market to Book Ratio	19,170	2.60	4.54	0.49	1.00	1.77	3.14	5.74
Log(# of Shares Outstanding)	20,862	2.29	1.31	0.77	1.45	2.19	3.06	4.02
Log(Total assets)	20,986	4.20	2.24	1.31	2.62	4.19	5.77	7.14

Table 5: The EDGAR System and Discretionary Accrual

This table shows how being subject to filing on EDGAR affects discretionary accrual at firm level. The unit of observation is firm-year. The coefficients are obtained by estimating the following specification:

$$EM_{i,t} = c_i + c_t + \beta * Post - EDGAR_{i,t} + Controls_{i,t} + \epsilon_{i,t}$$

where i indexes firm and t indexes year. Firm and year fixed effects are captured by c_i and c_t respectively. $Post - EDGAR_{i,t}$ equals 1 when firm i is subject to mandatory filing on EDGAR at year t. The suspect firm-years are firms with ROA from 0 to 0.5%. The dependent variable in Panel A is a proxy for discretionary accrual estimated using modified Jones model as in Dechow et al. (1995). The sample includes all firms on COMPUSTAT with available information from 1991 to 1998. All standard errors clustered at firm-level. t statistics in parentheses. * indicates statistical significance at the 10% level, ** at the 5% level, and *** at the 1% level.

Panel A

	(1)	(2)	(3)	(4)	(5)
Dep. Var.	Discretionary Accrual				
Post-EDGAR	0.0144***	0.0136***	0.0134***	0.0135***	0.00984**
	(5.83)	(2.60)	(2.99)	(3.01)	(2.17)
Suspect*Post-EDGAR				-0.00682	-0.00627
				(-0.64)	(-0.60)
Suspect				0.0162**	0.0177**
				(2.09)	(2.27)
Year FE		Yes	Yes	Yes	
Firm FE		Yes	Yes	Yes	Yes
Controls			Yes	Yes	Yes
Ind×Year FE					Yes
Group Time Trends					Yes
Observations	20996	20996	19167	19167	19167
Adjusted R^2	0.002	0.165	0.393	0.393	0.399

Panel B

	(1) Jones with intercept	(2) Jones w/o intercept
Post-EDGAR	0.0120***	0.0127***
	(2.83)	(3.02)
Year FE	Yes	Yes
Firm FE	Yes	Yes
Controls	Yes	Yes
Observations	19012	19012
Adjusted R^2	0.392	0.398

Table 6: The EDGAR System and Real Earnings Management

This table shows how being subject to filing on EDGAR affects firm's real earnings management. The unit of observation is firm-year. The coefficients are obtained by estimating the following specification:

$$EM_{i,t} = c_i + c_t + \beta * Post - EDGAR_{i,t} + Controls_{i,t} + \epsilon_{i,t}$$

where i indexes firm and t indexes year. Firm and year fixed effects are captured by c_i and c_t respectively. $Post - EDGAR_{i,t}$ equals 1 when firm i is subject to mandatory filing on EDGAR at year t. The suspect firm-years are firms in years with ROA from 0 to 0.5%. The dependent variables are proxies for real earnings management as in Roychowdhury (2006). The proxies include: abnormal cash flow from operations (cfo), abnormal production costs (prod), and abnormal discretionary expenses (disx). The sample includes all firms on COMPUSTAT with available information from 1991 to 1998. All standard errors clustered at firm-level. t statistics in parentheses. * indicates statistical significance at the 10% level, ** at the 5% level, and *** at the 1% level.

Panel A

	(1)	(2)	(3)
Dep. Var.	cfo	prod	disx
Post-EDGAR	-0.00647	0.00941**	0.00275
	(-1.39)	(2.00)	(0.43)
Suspect*Post-EDGAR	-0.0140	0.0221*	-0.00299
	(-1.24)	(1.75)	(-0.22)
Suspect	-0.000161	0.00143	-0.00334
	(-0.02)	(0.16)	(-0.31)
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Observations	19167	19167	19167
Adjusted R^2	0.444	0.722	0.720

Panel B

	(1)
	prod
Post-EDGAR	0.00965**
	(1.98)
Year FE	
Firm FE	Yes
Controls	Yes
Ind×Year FE	Yes
Group-Specific Time Trends	Yes
Observations	19167
Adjusted R^2	0.725

Table 7: Testing Samuels et al. (2018)

This table presents results of testing Samuels et al. (2018) using discretionary accrual (Panel A) and abnormal production costs (Panel B) as proxies for misreporting. The sample is split into firms that had low, medium, and high investor attention before the EDGAR system. For both panels, the 4 specifications only differ by how low and high ex-ante investor attention firms are defined. I use 4 different combinations of analyst following, institutional holdings, and total assets as of Dec 31^{st}, 1992 as proxies for investor attention: 1) no analyst following and total assets in the 1^{st} quartile 2) no analyst following and no institutional owner 3) no institutional owner and total assets in the 1^{st} quartile 4) no analyst following, no institutional owner, and total assets in the 1^{st} quartile. High ex-ante investor attention firms as of Dec 31^{st}, 1992 are those with 1) at least 1 analyst following and total assets in the 4^{th} quartile 2) at least 1 analyst following and at least 1 institutional owner 3) at least 1 institutional owner and total assets in the 4^{th} quartile 4) at least 1 analyst following, at least 1 institutional owner and total assets in the 4^{th} quartile. For each specification, the rest of the sample is then categorized as firms with medium ex-ante investor attention which are used as benchmark in the regressions. All standard errors clustered at firm-level. t statistics in parentheses. * indicates statistical significance at the 10% level, ** at the 5% level, and *** at the 1% level.

Panel A: Discretionary Accrual

	(1)	(2)	(3)	(4)
Post-EDGAR	0.00683	0.0132***	0.0114**	0.0104**
	(1.48)	(2.77)	(2.46)	(2.29)
Low-Attention*Post-EDGAR	0.0214***	0.000512	0.0136	0.0152*
	(2.92)	(0.10)	(1.51)	(1.70)
High-Attention*Post-EDGAR	0.00682	0.00120	-0.00236	0.00211
	(1.46)	(0.25)	(-0.60)	(0.46)
Omitted:				
Medium-Att* Post-EDGAR				
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Observations	19167	19167	19167	19167
Adjusted R^2	0.393	0.393	0.393	0.393

Panel B: Production Cost

	(1)	(2)	(3)	(4)
Post-EDGAR	0.00668	0.00866	0.00783	0.00781
	(1.30)	(1.60)	(1.51)	(1.56)
Low-Attention * Post-EDGAR	0.0167*	0.00574	0.0139	0.0145
	(1.90)	(0.88)	(1.32)	(1.39)
High-Attention * Post-EDGAR	-0.0160**	-0.0157**	-0.00567	-0.0123*
	(-2.25)	(-2.15)	(-1.05)	(-1.73)
Omitted:				
Medium-Att* Post-EDGAR				
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Observations	19167	19167	19167	19167
Adjusted R^2	0.722	0.722	0.722	0.722